

1600

```
DATE: 05/09/2003
                RAW SEQUENCE LISTING
                PATENT APPLICATION: US/09/825,769A
                                                         TIME: 12:39:25
                Input Set : A:\38777054.app
                Output Set: N:\CRF4\05092003\1825769A.raw
 3 <110> APPLICANT: BLAKE, MILAN S.
 4
         BOGDAN JR., JOHN A.
         NAZARIO-LARRIEU, JAVIER
 7 <120> TITLE OF INVENTION: METHOD FOR THE PRODUCTION OF BACTERIAL TOXINS
 9 <130> FILE REFERENCE: 38777-0054
11 <140> CURRENT APPLICATION NUMBER: 09/825,769A
12 <141> CURRENT FILING DATE: 2001-04-04
14 <150> PRIOR APPLICATION NUMBER: 60/194,478
15 <151> PRIOR FILING DATE: 2000-04-04
17 <160> NUMBER OF SEQ ID NOS: 12
19 <170> SOFTWARE: PatentIn Ver. 2.1
21 <210> SEQ ID NO: 1
                                                               ENTERED
22 <211> LENGTH: 10
23 <212> TYPE: DNA
24 <213> ORGANISM: Artificial Sequence
26 <220> FEATURE:
27 <223> OTHER INFORMATION: Description of Artificial Sequence: Synthetic
         oligonucleotide
30 <400> SEQUENCE: 1
31 gattgctgat
                                                                      10
34 <210> SEQ ID NO: 2
35 <211> LENGTH: 10
36 <212> TYPE: DNA
37 <213> ORGANISM: Artificial Sequence
39 <220> FEATURE:
40 <223> OTHER INFORMATION: Description of Artificial Sequence: Synthetic
        oligonucleotide
43 <400> SEQUENCE: 2
44 tagatggggc
                                                                      10
47 <210> SEQ ID NO: 3
48 <211> LENGTH: 21
49 <212> TYPE: DNA
50 <213> ORGANISM: Artificial Sequence
52 <220> FEATURE:
53 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer
55 <400> SEQUENCE: 3
56 atgagcaatc gccccatcta c
                                                                      21
59 <210> SEQ ID NO: 4
60 <211> LENGTH: 18
61 <212> TYPE: DNA
62 <213> ORGANISM: Artificial Sequence
64 <220> FEATURE:
65 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer
```

RAW SEQUENCE LISTING DATE: 05/09/2003
PATENT APPLICATION: US/09/825,769A TIME: 12:39:25

Input Set : A:\38777054.app

Output Set: N:\CRF4\05092003\I825769A.raw

```
67 <400> SEQUENCE: 4
68 cactatttgg tcggtcgg
                                                                       18
71 <210> SEQ ID NO: 5
72 <211> LENGTH: 19
73 <212> TYPE: PRT
74 <213> ORGANISM: Artificial Sequence
76 <220> FEATURE:
77 <223> OTHER INFORMATION: Description of Artificial Sequence: Synthetic
         peptide
80 <400> SEQUENCE: 5
81 Gly Gly Gly Asp Gly Ser Phe Ser Gly Phe Gly Asp Gly Ser Phe Ser
84 Gly Phe Gly
87 <210> SEQ ID NO: 6
88 <211> LENGTH: 403
89 <212> TYPE: PRT
90 <213> ORGANISM: Bordetella pertussis
92 <400> SEQUENCE: 6
93 Met Ser Asn Arg Pro Ile Tyr Leu Asp Tyr Ser Ala Thr Thr Pro Val
96 Asp Pro Ser Val Val Glu Lys Met Ile Pro Trp Leu Tyr Glu Ser Phe
                20
99 Gly Asn Pro Ala Ser Arg Ser His Arg Phe Gly Trp Glu Ala Glu Asp
             35
                                 40
102 Ala Val Glu Lys Ala Arg Glu Glu Val Ala Lys Leu Val Asn Ala Asp
                             55
105 Pro Arg Glu Ile Val Trp Thr Ser Gly Ala Thr Glu Ser Asp Asn Leu
                         70
108 Ala Ile Lys Gly Ala Ala Asn Phe Tyr Ala Glu Arg Gly Lys His Ile
111 Ile Thr Val Lys Thr Glu His Lys Ala Val Leu Asp Thr Cys Arg Glu
112
                100
                                    105
                                                         110
114 Leu Glu Arg Gln Gly Phe Glu Val Thr Tyr Leu Asp Val Gln Asp Asp
                                120
117 Gly Leu Leu Ser Leu Asp Ala Phe Lys Ala Ala Leu Arg Pro Asp Thr
        130
                            135
                                                 140
120 Ile Leu Val Ser Val Met Met Val Asn Asn Glu Ile Gly Val Ile Gln
                        150
                                            155
123 Asp Ile Ala Ala Leu Gly Glu Ile Cys Arg Glu Lys Gly Ile Ile Phe
                    165
                                        170
126 His Val Asp Ala Ala Gln Ala Thr Gly Lys Val Glu Ile Asp Leu Gln
                180
                                    185
129 Lys Leu Lys Val Asp Leu Met Ser Phe Ser Ala His Lys Thr Tyr Gly
                                200
132 Pro Lys Gly Ile Gly Ala Leu Tyr Val Arg Arg Lys Pro Arg Val Arg
133
                            215
                                                220
135 Ile Glu Ala Gln Met His Gly Gly Gly His Glu Arg Gly Phe Arg Ser
                        230
138 Gly Thr Leu Ala Thr His Gln Ile Val Gly Met Gly Glu Ala Phe Arq
```

RAW SEQUENCE LISTING DATE: 05/09/2003 PATENT APPLICATION: US/09/825,769A TIME: 12:39:25

Input Set : A:\38777054.app
Output Set: N:\CRF4\05092003\I825769A.raw

139					245					250					255	
	Leu	Ala	Arq	Glu	Glu	Met	Gly	Thr	Glu	Asn	Glu	Arq	Val	Arq	Met	Leu
142			_	260			*		265			,		270		
144	Arq	Asp	Arq	Leu	Leu	Ala	Gly	Leu	Thr	Gln	Ile	Glu	Glu	Val	Tyr	Val
145	,		275					280					285		-1	
	Asn	Glv		His	Glu	His	Ara		Pro	His	Asn	Leu		Ile	Ser	Phe
148		290					295					300				
	Agn		Va1	Glu	Glv	Glu		Len	Tle	Met	Ala		Lvs	Glu	Leu	Ala
	305	-1-	, 42	OLU	O	310	501	Lou	110	1100	315			014	Dea	320
		Ser	Ser	G1 v	Ser		Cvs	Thr	Ser	Δla		Leu	Glu	Pro	Ser	
154	141	001	501	O-1	325	1114	CID	****	DCI	330	501	Dea	O.Lu	110	335	- 1 -
	Val	T.Ou	Δτα	Δla		Glv	Δra	Δen	Δen		T.011	Δla	Иiс	Ser	Ser	T1a
157	VUI	пеа	nig	340	пси	OLY	nrg	non	345	OLU	DCu	niu	1113	350	Del	116
	λνα	Dho	Thr		C117	λνα	Dho	Thr		Clu	Cln	Glu.	т1д		Phe	Thr
160	Ary	FILE	355	Deu	GIY	лту	FILE	360	1111	GIU	GIII	GIU	365	тэр	FIIE	1111
	т10	Clu		т10	Tvc	Cor	λνα		Clu	Tvc	T 011	λνα		Mot	Ser	Dro
163	116	370	ьeu	116	пуз	Ser	375	Val	GIY	цуз	пец	380	изр	Mec	261	PIO
-	T 011		c1	Wat	7 l n	Cln		C1.	T10	N an	T 011		Com	17.2.1	Cln	m-m
	385	ттр	GIU	Met	Ата	390	GIU	GIY	ire	ASP	395	ASII	Ser	vai	Gln	
		31	77.2			390					393					400
	Ala				. 7											
	<210															
	<21				J3											
	<212								. .							
						iete.	lla p	perti	15515	3						
	<400	J> SI	:QUEI	WCE:	/											
, , ,	30 - 1	~				~ 1 -	-						cm 1	1. ·		1
		Ser	Asn	Arg		Ile	Tyr	Leu	Asp		Ser	Ala	Thr	Thr	Pro	Val
178	1			_	5					10					15	
178 180	1			Val	5				Ile	10				Glu		
178 180 181	1 Asp	Pro	Ser	Val	5 Val	Glu	Lys	Met	Ile 25	10 Pro	Trp	Leu	Tyr	Glu 30	15 Ser	Phe
178 180 181 183	1 Asp Gly	Pro	Ser Pro	Val	5 Val	Glu	Lys	Met His	Ile 25	10 Pro	Trp	Leu	Tyr Glu	Glu 30	15	Phe
178 180 181 183 184	1 Asp Gly	Pro Asn	Ser Pro 35	Val 20 Ala	5 Val Ser	Glu Arg	Lys Ser	Met His 40	Ile 25 Arg	10 Pro	Trp Gly	Leu Trp	Tyr Glu 45	Glu 30 Ala	15 Ser Glu	Phe Asp
178 180 181 183 184 186	1 Asp Gly	Pro Asn Val	Ser Pro 35	Val 20 Ala	5 Val Ser	Glu Arg	Lys Ser Glu	Met His 40	Ile 25 Arg	10 Pro	Trp Gly	Leu Trp Leu	Tyr Glu 45	Glu 30 Ala	15 Ser	Phe Asp
178 180 181 183 184 186 187	1 Asp Gly Ala	Pro Asn Val 50	Ser Pro 35 Glu	Val 20 Ala Lys	5 Val Ser Ala	Glu Arg Arg	Lys Ser Glu 55	Met His 40 Glu	Ile 25 Arg Val	10 Pro Phe Ala	Trp Gly Lys	Leu Trp Leu 60	Tyr Glu 45 Val	Glu 30 Ala Asn	15 Ser Glu Ala	Phe Asp Asp
178 180 181 183 184 186 187	1 Asp Gly Ala Pro	Pro Asn Val 50	Ser Pro 35 Glu	Val 20 Ala Lys	5 Val Ser Ala	Glu Arg Arg Trp	Lys Ser Glu 55	Met His 40 Glu	Ile 25 Arg Val	10 Pro Phe Ala	Trp Gly Lys Thr	Leu Trp Leu 60	Tyr Glu 45 Val	Glu 30 Ala Asn	15 Ser Glu	Phe Asp Asp Leu
178 180 181 183 184 186 187 189	1 Asp Gly Ala Pro 65	Pro Asn Val 50 Arg	Ser Pro 35 Glu Glu	Val 20 Ala Lys Ile	5 Val Ser Ala Val	Glu Arg Arg Trp 70	Lys Ser Glu 55 Thr	Met His 40 Glu Ser	Ile 25 Arg Val Gly	10 Pro Phe Ala Ala	Trp Gly Lys Thr 75	Leu Trp Leu 60 Glu	Tyr Glu 45 Val Ser	Glu 30 Ala Asn	15 Ser Glu Ala Asn	Phe Asp Asp Leu 80
178 180 181 183 184 186 187 189 190	1 Asp Gly Ala Pro 65	Pro Asn Val 50 Arg	Ser Pro 35 Glu Glu	Val 20 Ala Lys Ile	Ser Ala Val	Glu Arg Arg Trp 70	Lys Ser Glu 55 Thr	Met His 40 Glu Ser	Ile 25 Arg Val Gly	10 Pro Phe Ala Ala	Trp Gly Lys Thr 75	Leu Trp Leu 60 Glu	Tyr Glu 45 Val Ser	Glu 30 Ala Asn	15 Ser Glu Ala Asn His	Phe Asp Asp Leu 80
178 180 181 183 184 186 187 189 190 192 193	Asp Gly Ala Pro 65 Ala	Pro Asn Val 50 Arg	Ser Pro 35 Glu Glu	Val 20 Ala Lys Ile Gly	5 Val Ser Ala Val Ala 85	Glu Arg Arg Trp 70 Ala	Lys Ser Glu 55 Thr	Met His 40 Glu Ser	Ile 25 Arg Val Gly	10 Pro Phe Ala Ala Ala	Trp Gly Lys Thr 75 Glu	Leu Trp Leu 60 Glu Arg	Tyr Glu 45 Val Ser Gly	Glu 30 Ala Asn Asp Lys	15 Ser Glu Ala Asn His 95	Phe Asp Asp Leu 80 Ile
178 180 181 183 184 186 187 189 190 192 193 195	Asp Gly Ala Pro 65 Ala	Pro Asn Val 50 Arg	Ser Pro 35 Glu Glu	Val 20 Ala Lys Ile Gly Lys	5 Val Ser Ala Val Ala 85	Glu Arg Arg Trp 70 Ala	Lys Ser Glu 55 Thr	Met His 40 Glu Ser	Ile 25 Arg Val Gly Tyr	10 Pro Phe Ala Ala Ala	Trp Gly Lys Thr 75 Glu	Leu Trp Leu 60 Glu Arg	Tyr Glu 45 Val Ser Gly	Glu 30 Ala Asn Asp Lys	15 Ser Glu Ala Asn His	Phe Asp Asp Leu 80 Ile
178 180 181 183 184 186 187 189 190 192 193 195 196	Asp Gly Ala Pro 65 Ala Ile	Pro Asn Val 50 Arg Ile Thr	Ser Pro 35 Glu Glu Lys Val	Val 20 Ala Lys Ile Gly Lys 100	Ser Ala Val Ala 85 Thr	Glu Arg Arg Trp 70 Ala Glu	Lys Ser Glu 55 Thr Asn	Met His 40 Glu Ser Phe Lys	Ile 25 Arg Val Gly Tyr Ala 105	10 Pro Phe Ala Ala Ala 90 Val	Trp Gly Lys Thr 75 Glu Leu	Leu Trp Leu 60 Glu Arg	Tyr Glu 45 Val Ser Gly Thr	Glu 30 Ala Asn Asp Lys Cys 110	15 Ser Glu Ala Asn His 95 Arg	Phe Asp Asp Leu 80 Ile Glu
178 180 181 183 184 186 187 189 190 192 193 195 196 198	Asp Gly Ala Pro 65 Ala Ile	Pro Asn Val 50 Arg Ile Thr	Ser Pro 35 Glu Glu Lys Val Arg	Val 20 Ala Lys Ile Gly Lys 100	Ser Ala Val Ala 85 Thr	Glu Arg Arg Trp 70 Ala Glu	Lys Ser Glu 55 Thr Asn	Met His 40 Glu Ser Phe Lys Val	Ile 25 Arg Val Gly Tyr Ala 105	10 Pro Phe Ala Ala Ala 90 Val	Trp Gly Lys Thr 75 Glu Leu	Leu Trp Leu 60 Glu Arg	Tyr Glu 45 Val Ser Gly Thr	Glu 30 Ala Asn Asp Lys Cys 110	15 Ser Glu Ala Asn His 95	Phe Asp Asp Leu 80 Ile Glu
178 180 181 183 184 186 187 189 190 192 193 195 196 198 199	1 Asp Gly Ala Pro 65 Ala Ile Leu	Pro Asn Val 50 Arg Ile Thr	Ser Pro 35 Glu Glu Lys Val Arg 115	Val 20 Ala Lys Ile Gly Lys 100 Gln	Ser Ala Val Ala 85 Thr	Glu Arg Arg Trp 70 Ala Glu Phe	Lys Ser Glu 55 Thr Asn His	Met His 40 Glu Ser Phe Lys Val 120	Ile 25 Arg Val Gly Tyr Ala 105 Thr	10 Pro Phe Ala Ala 90 Val	Trp Gly Lys Thr 75 Glu Leu Leu	Leu Trp Leu 60 Glu Arg Asp	Tyr Glu 45 Val Ser Gly Thr Val 125	Glu 30 Ala Asn Asp Lys Cys 110 Gln	15 Ser Glu Ala Asn His 95 Arg	Phe Asp Asp Leu 80 Ile Glu Asp
178 180 181 183 184 186 187 189 190 192 193 195 196 198 199	1 Asp Gly Ala Pro 65 Ala Ile Leu	Pro Asn Val 50 Arg Ile Thr	Ser Pro 35 Glu Glu Lys Val Arg 115	Val 20 Ala Lys Ile Gly Lys 100 Gln	Ser Ala Val Ala 85 Thr	Glu Arg Arg Trp 70 Ala Glu Phe	Lys Ser Glu 55 Thr Asn His	Met His 40 Glu Ser Phe Lys Val 120	Ile 25 Arg Val Gly Tyr Ala 105 Thr	10 Pro Phe Ala Ala 90 Val	Trp Gly Lys Thr 75 Glu Leu Leu	Leu Trp Leu 60 Glu Arg Asp	Tyr Glu 45 Val Ser Gly Thr Val 125	Glu 30 Ala Asn Asp Lys Cys 110 Gln	15 Ser Glu Ala Asn His 95 Arg	Phe Asp Asp Leu 80 Ile Glu Asp
178 180 181 183 184 186 187 189 190 192 193 195 196 198 199 201 202	Asp Gly Ala Pro 65 Ala Ile Leu Gly	Pro Asn Val 50 Arg Ile Thr Glu Leu 130	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser	Ser Ala Val Ala 85 Thr Gly Leu	Glu Arg Trp 70 Ala Glu Phe Asp	Lys Ser Glu 55 Thr Asn His Glu Ala 135	Met His 40 Glu Ser Phe Lys Val 120 Phe	Ile 25 Arg Val Gly Tyr Ala 105 Thr	10 Pro Phe Ala Ala 90 Val Tyr	Trp Gly Lys Thr 75 Glu Leu Leu Ala	Leu Trp Leu 60 Glu Arg Asp Asp Leu 140	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro	15 ser Glu Ala Asn His 95 Arg Asp	Phe Asp Asp Leu 80 Ile Glu Asp
178 180 181 183 184 186 187 189 190 192 193 195 196 198 199 201 202	Asp Gly Ala Pro 65 Ala Ile Leu Gly	Pro Asn Val 50 Arg Ile Thr Glu Leu 130	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser	Ser Ala Val Ala 85 Thr Gly Leu	Glu Arg Trp 70 Ala Glu Phe Asp	Lys Ser Glu 55 Thr Asn His Glu Ala 135	Met His 40 Glu Ser Phe Lys Val 120 Phe	Ile 25 Arg Val Gly Tyr Ala 105 Thr	10 Pro Phe Ala Ala 90 Val Tyr	Trp Gly Lys Thr 75 Glu Leu Leu Ala	Leu Trp Leu 60 Glu Arg Asp Asp Leu 140	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro	15 Ser Glu Ala Asn His 95 Arg	Phe Asp Asp Leu 80 Ile Glu Asp
178 180 181 183 184 186 187 189 190 192 193 195 196 198 201 202 204 205	Asp Gly Ala Pro 65 Ala Ile Leu Gly Ile 145	Pro Asn Val 50 Arg Ile Thr Glu Leu 130 Leu	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu Val	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser	Ser Ala Val Ala 85 Thr Gly Leu Val	Glu Arg Arg Trp 70 Ala Glu Phe Asp Met 150	Lys Ser Glu 55 Thr Asn His Glu Ala 135 Met	Met His 40 Glu Ser Phe Lys Val 120 Phe Val	Ile 25 Arg Val Gly Tyr Ala 105 Thr Lys Asn	10 Pro Phe Ala Ala 90 Val Tyr Ala Asn	Trp Gly Lys Thr 75 Glu Leu Leu Ala Glu 155	Leu Trp Leu 60 Glu Arg Asp Asp Leu 140 Ile	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg Gly	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro Val	15 ser Glu Ala Asn His 95 Arg Asp	Phe Asp Asp Leu 80 Ile Glu Asp Thr Gln 160
178 180 181 183 184 186 187 189 190 192 193 195 196 198 201 202 204 205	Asp Gly Ala Pro 65 Ala Ile Leu Gly Ile 145	Pro Asn Val 50 Arg Ile Thr Glu Leu 130 Leu	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu Val	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser	Ser Ala Val Ala 85 Thr Gly Leu Val	Glu Arg Arg Trp 70 Ala Glu Phe Asp Met 150	Lys Ser Glu 55 Thr Asn His Glu Ala 135 Met	Met His 40 Glu Ser Phe Lys Val 120 Phe Val	Ile 25 Arg Val Gly Tyr Ala 105 Thr Lys Asn	10 Pro Phe Ala Ala 90 Val Tyr Ala Asn	Trp Gly Lys Thr 75 Glu Leu Leu Ala Glu 155	Leu Trp Leu 60 Glu Arg Asp Asp Leu 140 Ile	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg Gly	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro Val	15 ser Glu Ala Asn His 95 Arg Asp	Phe Asp Asp Leu 80 Ile Glu Asp Thr Gln 160
178 180 181 183 184 186 187 189 190 192 193 195 196 198 201 202 204 205	Asp Gly Ala Pro 65 Ala Ile Leu Gly Ile 145	Pro Asn Val 50 Arg Ile Thr Glu Leu 130 Leu	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu Val	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser	Ser Ala Val Ala 85 Thr Gly Leu Val	Glu Arg Arg Trp 70 Ala Glu Phe Asp Met 150	Lys Ser Glu 55 Thr Asn His Glu Ala 135 Met	Met His 40 Glu Ser Phe Lys Val 120 Phe Val	Ile 25 Arg Val Gly Tyr Ala 105 Thr Lys Asn	10 Pro Phe Ala Ala 90 Val Tyr Ala Asn	Trp Gly Lys Thr 75 Glu Leu Leu Ala Glu 155	Leu Trp Leu 60 Glu Arg Asp Asp Leu 140 Ile	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg Gly	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro Val	15 ser Glu Ala Asn His 95 Arg Asp	Phe Asp Asp Leu 80 Ile Glu Asp Thr Gln 160
178 180 181 183 184 186 187 190 192 193 195 196 198 201 202 204 205 207 208	Asp Gly Ala Pro 65 Ala Ile Leu Gly Ile 145 Asp	Pro Asn Val 50 Arg Ile Thr Glu Leu 130 Leu Ile	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu Val Ala	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser Ser	Ser Ala Val Ala 85 Thr Gly Leu Val Leu 165	Glu Arg Trp 70 Ala Glu Phe Asp Met 150 Gly	Lys Ser Glu 55 Thr Asn His Glu Ala 135 Met Glu	Met His 40 Glu Ser Phe Lys Val 120 Phe Val Ile	Ile 25 Arg Val Gly Tyr Ala 105 Thr Lys Asn Cys	10 Pro Phe Ala Ala 90 Val Tyr Ala Asn Arg	Trp Gly Lys Thr 75 Glu Leu Leu Ala Glu 155 Glu	Leu Trp Leu 60 Glu Arg Asp Leu 140 Ile Lys	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg Gly Gly	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro Val Ile	15 ser Glu Ala Asn His 95 Arg Asp Ile	Phe Asp Asp Leu 80 Ile Glu Asp Thr Gln 160 Phe
178 180 181 183 184 186 187 190 192 193 195 196 198 201 202 204 205 207 208	Asp Gly Ala Pro 65 Ala Ile Leu Gly Ile 145 Asp	Pro Asn Val 50 Arg Ile Thr Glu Leu 130 Leu Ile	Ser Pro 35 Glu Glu Lys Val Arg 115 Leu Val Ala	Val 20 Ala Lys Ile Gly Lys 100 Gln Ser Ser	Ser Ala Val Ala 85 Thr Gly Leu Val Leu 165	Glu Arg Trp 70 Ala Glu Phe Asp Met 150 Gly	Lys Ser Glu 55 Thr Asn His Glu Ala 135 Met Glu	Met His 40 Glu Ser Phe Lys Val 120 Phe Val Ile	Ile 25 Arg Val Gly Tyr Ala 105 Thr Lys Asn Cys	10 Pro Phe Ala Ala 90 Val Tyr Ala Asn Arg	Trp Gly Lys Thr 75 Glu Leu Leu Ala Glu 155 Glu	Leu Trp Leu 60 Glu Arg Asp Leu 140 Ile Lys	Tyr Glu 45 Val Ser Gly Thr Val 125 Arg Gly Gly	Glu 30 Ala Asn Asp Lys Cys 110 Gln Pro Val Ile	15 Ser Glu Ala Asn His 95 Arg Asp Ile Ile 175	Phe Asp Asp Leu 80 Ile Glu Asp Thr Gln 160 Phe

RAW SEQUENCE LISTINGPATENT APPLICATION: US/09/825,769A

DATE: 05/09/2003

TIME: 12:39:25

Input Set : A:\38777054.app

Output Set: N:\CRF4\05092003\I825769A.raw

```
213 Lys Leu Lys Val Asp Leu Met Ser Phe Ser Ala His Lys Thr Tyr Gly
                                200
                                                     205
214
            195
216 Pro Lys Gly Ile Gly Ala Leu Tyr Val Arg Arg Lys Pro Arg Val Arg
217
        210
                            215
219 Ile Glu Ala Gln Met His Gly Gly Gly His Glu Arg Gly Phe Arg Ser
220 225
                        230
                                            235
222 Gly Thr Leu Ala Thr His Gln Ile Val Gly Met Gly Glu Ala Phe Arg
223
                    245
                                        250
225 Leu Ala Arg Glu Glu Met Gly Thr Glu Asn Glu Arg Val Arg Met Leu
                                    265
228 Arg Asp Arg Leu Leu Ala Gly Leu Thr Gln Ile Glu Glu Val Tyr Val
            275
                                280
                                                     285
231 Asn Gly Ser His Glu His Arq Val Pro His Asn Leu Asn Ile Ser Phe
                            295
234 Asn Tyr Val Glu Gly Glu Ser Leu Ile Met Ala Ile Lys Glu Leu Ala
235 305
                                            315
237 Val Ser Ser Gly Ser Ala Cys Thr Ser Ala Ser Leu Glu Pro Ser Tyr
238
                    325
                                        330
240 Val Leu Arg Ala Leu Gly Arg Asn Asp Glu Leu Ala His Ser Ser Ile
                340
                                    345
243 Arg Phe Thr Leu Gly Arg Phe Thr Thr Glu Gln Glu Ile Asp Phe Thr
244
            355
                                360
                                                     365
246 Ile Glu Leu Ile Lys Ser Arg Val Gly Lys Leu Arg Asp Met Ser Pro
                            375
249 Leu Trp Glu Met Ala Gln Glu Gly Ile Asp Leu Asn Ser Val Gln Trp
250 385
                        390
                                            395
                                                                 400
252 Ala Ala His
255 <210> SEQ ID NO: 8
256 <211> LENGTH: 1212
257 <212> TYPE: DNA
258 <213> ORGANISM: Bordetella pertussis
260 <400> SEOUENCE: 8
261 atgageaate geoceateta cetggaetae teggetaeea egeoggtega eeegagegtg 60
262 gtcgagaaaa tgattccctg gttgtacgag agtttcggca atccggcctc gcgcagccac 120
263 gcctttggct gggaagccga ggacgcggtc gagaaggccc gcgaggaagt tgccaagctg 180
264 gtcaacgccg atccgcgcga gatcgtctgg acttccggcg ctaccgagtc ggacaacctg 240
265 gccatcaagg gcgcggcgaa tttctacgcc gagcgcggca agcacatcat taccgtcaag 300
266 accgaacaca aggcggtgct ggatacctgt cgggagctcg aacgccaggg ctttgaagtg 360
267 acctacctgg atgtccagga cgatggtctg ctcagcctcg atgcgttcaa ggctgcgctg 420
268 cgcccggata ccatcctggt gtcggtgatg atggtcaaca acgagatcgg cgtcatccag 480
269 gacategeeg egetgggega gatetgeege gagaagggea teatetteea egtggaegeg 540
270 gcccaggcca ccggcaaggt cgagatcgac ctgcagaagc tgaaggtgga cctgatgtcg 600
271 ttctcggcgc acaagacgta cggccccaag ggcatcggcg cgctgtatgt gcggcgcaag 660
272 cegegegtge geategagge geagatgeae ggeggeggee aegaaegggg etteeggteg 720
273 ggcacgctgg ccacgcacca gatcgtcggc atgggcgagg cgttccgcct ggcgcgcgag 780
274 gaaatgggca ccgagaacga gcgcgtgcgc atgctgcgcg accgcctgct ggccggcctg 840
275 acgcagatcg aggaagtgta tgtgaacggc agcatggagc accgcgtgcc gcacaacctg 900
276 aacatcagct tcaactatgt cgagggcgag tctctgatca tggcgatcaa ggagctggcc 960
277 gtttccagcg gttcggcctg cacgtcggcc agcctggagc cgtcctatgt gctgcgcgcg 1020
```

DATE: 05/09/2003

PATENT APPLICATION: US/09/825,769A TIME: 12:39:25 Input Set : A:\38777054.app Output Set: N:\CRF4\05092003\1825769A.raw 278 ctgggccgca acgacgagct ggcgcacagc tccatccgct ttaccctggg ccgcttcacg 1080 279 accqaacagg aaatcgactt cacgatcgaa ctgatcaaga gtcgtgtcgg caagctgcgc 1140 280 gatatgtege egttgtggga aatggeeeag gaaggeattg atetgaatte egtgeagtgg 1200 281 geogegeact ga 284 <210> SEQ ID NO: 9 285 <211> LENGTH: 565 286 <212> TYPE: DNA 287 <213> ORGANISM: Bordetella pertussis 289 <400> SEQUENCE: 9 290 atgagcaatc gccccatcta cctggactac tcggctacca cgccggtcga cccgagcgtg 60 291 gtcgagaaaa tgattccctg gttgtacgag agtttcggca atccggcctc gcgcagccac 120 292 gcctttggct gggaagccga ggacgcggtc gagaaggccc gcgaggaagt tgccaagctg 180 293 gtcaacqccq atccqcqcqa gatcqtctqq acttccqqcq ctaccqaqtc qqacaacctq 240 294 gccatcaagg gcgcggcgaa tttctacgcc gagcgcggca agcacatcat taccgtcaag 300 295 accgaacaca aggcggtgct ggatacctgt cgggagctcg aacgccaggg ctttgaagtg 360 296 acctacctgg atgtccagga cgatggtctg ctcagcctcg atgcgttcaa ggctqcqctq 420 297 cgcccggata ccatcctggt gtcggtgatg atggtcaaca acgagatcgg cgtcatccag 480 298 gacategeeg egetgggega gatetgeege gagaagggea eatetteeae gtggaegegg 540 299 ccaagccaac ggcaaggtcg agatc 565 302 <210> SEQ ID NO: 10 303 <211> LENGTH: 560 304 <212> TYPE: DNA 305 <213> ORGANISM: Bordetella pertussis 307 <220> FEATURE: 308 <221> NAME/KEY: modified_base 309 <222> LOCATION: (18) 310 <223> OTHER INFORMATION: a, t, c, g, other or unknown 312 <220> FEATURE: 313 <221> NAME/KEY: modified_base 314 <222> LOCATION: (20) 315 <223> OTHER INFORMATION: a, t, c, q, other or unknown 317 <220> FEATURE: 318 <221> NAME/KEY: modified_base 319 <222> LOCATION: (75) 320 <223> OTHER INFORMATION: a, t, c, q, other or unknown 322 <220> FEATURE: 323 <221> NAME/KEY: modified_base 324 <222> LOCATION: (338) 325 <223> OTHER INFORMATION: a, t, c, g, other or unknown 327 <400> SEQUENCE: 10 W--> 328 ggegcaagec gegegtgngn ategaggege agatgeaegg eggeggeeae gaaegggget 60 329 teeggteggg caegntggee aegeaceaga tegteggeat gggegaggeg tteegeetgg 120 330 cgcgcgagga aatgggcacc gagaacgagc gcgtgcgcat gctgcgcgac cgcctgctgg 180 331 ccggcctgac gcagatcgag gaagtgtatg tgaacggcag catggagcac cgcgtgccgc 240 332 acaacctgaa catcagcttc aactatgteg agggcgagtc tetgatcatg gegatcaagg 300 333 agetggeegt ttecageggt teggeetgea egteggenag eetggageeg teetatgtge 360

334 tgcgcgcgct gggccgcaac gacgagctgg cgcacagctc catccgcttt accctgggcc 420 335 gcttcacgac cgaacaggaa atcgacttca cgatcgaact gatcaagagt cgtgtcggca 480 336 agctgcgcga tatgtcgccg ttgtgggaaa tggcccagga aggcattgat ctgaattccg 540

RAW SEQUENCE LISTING

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/09/825,769A

DATE: 05/09/2003 TIME: 12:39:26

Input Set : A:\38777054.app

Output Set: N:\CRF4\05092003\I825769A.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:10; N Pos. 18,20,75,338 Seq#:12; N Pos. 247 VERIFICATION SUMMARY

PATENT APPLICATION: US/09/825,769A TIME: 12:39:26

DATE: 05/09/2003

Input Set : A:\38777054.app

Output Set: N:\CRF4\05092003\1825769A.raw

 $L:328\ M:341\ W:$ (46) "n" or "Xaa" used, for SEQ ID#:10 after pos.:0

M:341 Repeated in SeqNo=10

L:371 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12 after pos.:240